

What is claimed:

1 1. An apparatus for processing PFC to be disposed in a succeeding stage of a
2 vacuum pump that is connected to a vacuum chamber that is used in a process for
3 manufacturing electronic devices, the processing apparatus comprising:

4 a plasma process section that irradiates plasma to the PFC that is discharged under
5 the atmospheric pressure through a vacuum pump, and a reactive material supply section
6 that is disposed in a preceding stage of the plasma process section and adds a reactive
7 material to the PFC to produce a mixed gas, wherein the mixed gas is subject to a plasma
8 process under the atmospheric pressure to generate a polymer with the PFC and the reactive
9 material.

1 2. An apparatus for processing PFC according to claim 1, wherein the reactive
2 material is gas of paraffin hydrocarbon or alcohol.

1 3. An apparatus for processing PFC to be disposed in a succeeding stage of a
2 vacuum pump that is connected to a vacuum chamber that is used in a process for
3 manufacturing electronic devices, the processing apparatus comprising:

4 a reactive material supply section at atmospheric pressure, the reactive material
5 supply section being adapted to receive the PFC from the vacuum pump and to add at least
6 one of water and oxygen to the PFC at atmospheric pressure to form a mixed gas; and

7 an atmospheric pressure plasma process section that irradiates plasma to the mixed
8 gas at atmospheric pressure to decompose the PFC.

1 4. An apparatus for processing PFC according to claim 1, further comprising a
2 cyclone collector provided in a succeeding stage of the plasma process section, wherein the
3 polymer is collected by the cyclone collector.

1 5. An apparatus for processing PFC according to claim 4, further comprising a
2 pair of open/close type partition boards provided at a bottom section of the cyclone collector

3 where the polymer deposits to provide a double chamber structure at the bottom section,
4 wherein deposition and recovery of the polymer can be simultaneously conducted by
5 open/close operation of the partition boards.

1 6. A processing system comprising:
2 a processing chamber adapted to perform processing at below atmospheric pressure
3 using at least a perfluorocarbon gas;
4 a vacuum pump connected to the processing chamber;
5 an atmospheric pressure section connected to the vacuum pump, wherein the vacuum
6 pump is adapted to evacuate gas including perfluorocarbon gas from the processing chamber
7 and deliver the gas including perfluorocarbon gas to the atmospheric section;
8 a reactive material input coupled to the atmospheric section, the reactive gas input
9 being adapted to supply a reactive material to the gas including perfluorocarbon gas to form
10 a mixed gas; and
11 a plasma processing device coupled to the atmospheric section and adapted to
12 process the mixed gas to form a reaction product including a polymer.

1 7. A processing system as in claim 6, further comprising a gas inlet coupled to
2 the system after the plasma process section and a polymer collection chamber coupled to the
3 system after the gas inlet.

1 8. A processing system as in claim 7, wherein the gas inlet is coupled to a
2 supply of hydrogen gas.

1 9. A processing system as in claim 6, wherein the reactive material input
2 includes a supply of a paraffin hydrocarbon.

1 10. A processing system as in claim 6, wherein the reactive material input
2 includes a supply of an alcohol.

1 11. A processing system as in claim 6, wherein the reactive material is selected
2 from the group consisting of CH₃OH and C₂H₅OH.

1 12. A processing system as in claim 6, wherein the perfluorocarbon gas is
2 selected from the group consisting of CF₄, C₂F₆, C₄F₈ and SF₆.

1 13. A processing system as in claim 6, wherein the perfluorocarbon gas consists
2 of fluorine and a material selected from carbon and silicon.

1 14. A processing system as in claim 6, further comprising a reaction product
2 delivery system including a delivery pipe and a cyclone collector; the cyclone collector
3 including a chamber that is shaped to control the flow of the reaction product so that at least
4 a portion of the reaction product flows in a circular motion.

1 15. A processing system as in claim 6, further comprising a reaction product
2 delivery system comprising:
3 a collection chamber;
4 a pipe adapted to transport the reaction product from the plasma processing section
5 to the collection chamber;
6 a gas port adapted to transport gas out of the collection chamber;
7 a first partition board adapted to extend across a portion of the collection chamber
8 and collect a polymer product from the reaction product when the first partition board is in a
9 closed position; and
10 a second partition board positioned to collect reaction product from the first partition
11 board when the first partition board is in an open position.

1 16. A processing system as in claim 15, wherein the first partition board and the
2 second partition board are formed with hinged structures so that the first partition board and
3 the second partition board can be opened and closed.

1 17. A processing system as in claim 6, further comprising a reaction product
2 delivery system comprising a collection chamber including sloped sidewalls, an upper gas
3 port, and first and second lower partition boards, wherein the first partition board is
4 positioned between the second partition board and the upper gas port.

1 18. A processing system as in claim 16, wherein an upper portion of the chamber
2 defined in part by an upper region of the sloped sidewalls has a greater volume than a lower
3 portion of the chamber, wherein the first partition board is positioned in the lower portion of
4 the chamber.

1 19. A processing system as in claim 7, further comprising a gas inlet coupled to
2 the system after the plasma process section and a polymer collection chamber coupled to the
3 system after the gas inlet, wherein the gas inlet is coupled to a supply of hydrogen gas;
4 wherein the reactive material is selected from the group consisting of CH₃OH and C₂H₅OH;
5 and wherein the perfluorocarbon gas is selected from the group consisting of CF₄, C₂F₆,
6 C₄F₈ and SF₆.